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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/816,158

03/31/2004

Tao Pan

K35R1875

9051

35219

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10/03/2006

WESTERN DIGITAL TECHNOLOGIES, INC.

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EXAMINER

RENNER, CRAIG A

ART UNIT

PAPER NUMBER

2627

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/816,158

Applicant(s)

PAN, TAO

Examiner

Craig A. Renner

Art Unit

2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 12-23,26,27,31,33,36 and 37 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-11 is/are allowed.
- 6) ☒ Claim(s) 24,25,28-30,32 and 34 is/are rejected.
- 7) ☒ Claim(s) 35 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>31 March 2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of "Species 1," upon which "Claims 1-11, 24-26, 28-32, 34-35, and 37" are said to "read," in the reply filed on 21 September 2006 is acknowledged. Claims 11, 26, 31, and 37, however, do not read on elected species I of FIGS. 1 and 2 as elected species I of FIGS. 1 and 2 does not include "wherein the pinned layer is a first part of a pinning structure, the pinning structure including a second part that is made of hard magnetic material that extends at least twice as far as the pinned layer extends in a stripe-height direction that is perpendicular to the track-width direction" as per claim 11 (emphasis added), "wherein the spacer layer includes a plurality of heterogeneous materials" as per claim 26 (emphasis added), and "wherein the spacer layer contains ruthenium, chromium, rhodium, iridium or copper, and has a thickness that is less than two nanometers" as per claims 31 and 37 (emphasis added). It is noted, however, that elected species I of FIGS. 1 and 2 does include spacer layer 40 containing copper (Cu), chromium (Cr), tantalum (Ta), other metals or alloys to a thickness typically in a range between about one nanometer and fifty nanometers in paragraph [0020], for instance. Accordingly, claims 11-23, 26-27, 31, 33 and 36-37 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim.

2. Upon further consideration, claim 1 is generic and allowable over the prior art of record. The restriction requirement between species, as set forth in the Office action mailed on 25 July 2006, has been reconsidered in view of the allowability of claims to the elected invention pursuant to MPEP § 821.04(a). **The restriction requirement is hereby withdrawn as to any claim that requires all the limitations of an allowable generic claim.** Claim 11, directed to one or more non-elected species, is no longer withdrawn from consideration because this claim requires all the limitations of an allowable generic claim. However, claims 12-23, 26-27, 31, 33 and 36-37, directed to one or more non-elected species, remain withdrawn from consideration because they do not require all the limitations of an allowable generic claim.

In view of the above noted withdrawal of the restriction requirement, applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

### ***Drawings***

3. The drawings are objected to because of the following informalities:

a. The drawings fail to comply with 37 CFR 1.84(p)(5) because they include one or more reference signs not mentioned in the description. Note, for instance, "162" (shown twice in each of FIGS. 3 and 5, for instance), "245" (shown in FIGS. 7 and 8, for instance), "251" (shown in FIGS. 7 and 8, for instance), "280" (shown in FIGS. 7 and 8, for instance), "290" (shown in FIGS. 7 and 8, for instance), "370" (shown twice in FIG. 9, for instance), "377" (shown twice in FIG. 9, for instance), "382" (shown in FIG. 9, for instance), and "390" (shown in FIG. 9, for instance).

b. In FIG. 8, reference sign "278" should be drawn to the "insulating layer" in order to be consistent with the remainder of the disclosure.

c. In FIG. 10, reference sign "178" should be changed to --478-- in order to be consistent with the remainder of the disclosure.

d. In FIG. 10, the right, upper-most reference sign "430" and its associated lead line should be removed since it is not drawn to the "electrically conductive, nonmagnetic layer" as is done by the left, lower-most reference sign "430."

e. In FIG. 10, the right, lower-most reference sign "472" and its associated lead line should be removed since it is not drawn to the "dots" as is done by the left, upper-most reference sign "472."

Corrected drawing sheets in compliance with 37 CFR 1.121(d) and/or an amendment to the specification in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "second part that is made of hard magnetic material that extends at least twice as far as the pinned layer extends in a stripe-height direction that is perpendicular to the track-width direction" as set forth in claim 11 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) and/or an amendment to the claims in compliance with 37 CFR 1.121(c) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes

made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

6. The disclosure is objected to because of the following informality:

In line 6 of paragraph [0041] on page 13, "first section 21o" should be changed to --first section 210-- in order to be consistent with the remainder of the disclosure. Appropriate correction is required.

7. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 24, 25, 28, 30 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Mao (US 6,466,419).

Mao teaches a magnetic structure (150) comprising a ferromagnetic layer (160) that extends in a first direction a first distance (as shown in FIG. 5B, for instance); a nonferromagnetic spacer layer (162) that adjoins the ferromagnetic layer (as shown in FIG. 5B, for instance); and a ferromagnetic structure (includes 164 and 168, for instance) that is separated from the ferromagnetic layer by the spacer layer (as shown in FIG. 5B, for instance), the ferromagnetic structure having a first section (164) that extends in the first direction a second distance that is substantially equal to the first distance (as shown in FIG. 5B, for instance), the ferromagnetic structure having a second section (168) that is disposed further than the first section from the spacer layer (as shown in FIG. 5B, for instance), the second section extending at least twice as far as the first section in the first direction (as shown in FIG. 5B, for instance) [as per claim 24]; wherein the spacer layer is made of electrically conductive material (lines 18-20 in column 5, for instance, i.e., "Cu," for instance, is an electrically conductive material) [as per claim 25]; wherein the first and second sections are made of substantially the same



material (lines 24-25 in column 5, for instance, i.e., "CoFe") [as per claim 28]; wherein the first section is made of a first layer (164) and the second section is made of a second layer (168) [as per claim 30]; and wherein the ferromagnetic layer has a magnetic moment that rotates in the presence of an applied magnetic field (line 13 in column 5, for instance, i.e., "free"), and the ferromagnetic structure has a magnetic moment that does not rotate in the presence of the applied magnetic field (lines 22-25 in column 5, for instance, i.e., "Pinned") [as per claim 32].

9. Claims 24, 28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Jayasekara (US 2002/0167767).

Jayasekara teaches a magnetic structure (76, for instance) comprising a ferromagnetic layer (90) that extends in a first direction a first distance (as shown in FIG. 2A, for instance); a nonferromagnetic spacer layer (88) that adjoins the ferromagnetic layer (as shown in FIG. 2A, for instance); and a ferromagnetic structure (86) that is separated from the ferromagnetic layer by the spacer layer (as shown in FIG. 2A, for instance), the ferromagnetic structure having a first section that extends in the first direction a second distance that is substantially equal to the first distance (as shown in FIG. 2A, for instance), the ferromagnetic structure having a second section that is disposed further than the first section from the spacer layer (as shown in FIG. 2A, for instance), the second section extending at least twice as far as the first section in the first direction (as shown in FIG. 2A, for instance) [as per claim 24]; wherein the first and second sections are made of substantially the same material (as shown in FIG. 2A, for

instance) [as per claim 28]; and wherein the ferromagnetic structure is a layer that is notched at opposite ends of the first section (as shown in FIG. 2A, for instance) [as per claim 29].

10. Claim 34 is rejected under 35 U.S.C. 102(b) as being anticipated by Ooshima et al. (US 2002/0024781).

Ooshima teaches a magnetic structure (1) comprising a ferromagnetic layer (7a) that extends in a first direction between two ends (as shown in FIG. 1, for instance); an electrically conductive, nonmagnetic spacer layer (7c) that adjoins the ferromagnetic layer (as shown in FIG. 1, for instance); and a ferromagnetic structure (includes 7b and 5, for instance) that is separated from the ferromagnetic layer by the spacer layer (as shown in FIG. 1, for instance), the ferromagnetic structure having a first section (7b) extending between two edges in the first direction such that the ends of the ferromagnetic layer are magnetically coupled to the edges of the first section (as shown in FIG. 1, for instance), the ferromagnetic structure having a second section (5) that is separated from the spacer layer by the first section (as shown in FIG. 1, for instance), the second section extending at least twice as far as the first section in the first direction (as shown in FIG. 1, for instance).

***Pertinent Prior Art***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. This includes Hayashi et al. (US 2002/0097540), which teaches a magnetic sensor (FIG. 90, for instance) with an in-stack free layer biasing structure (includes 8b, for instance) that extends to regions outside a free layer (3b).

***Allowable Subject Matter***

12. Claims 1-11 are allowable over the prior art of record. Claim 35 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

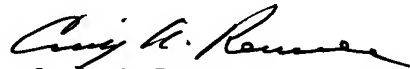
***Conclusion***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Monday-Tuesday & Thursday-Friday 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2627

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Craig A. Renner  
Primary Examiner  
Art Unit 2627

CAR